Medical Isotope Research and Production Program (MIRP) - *Infrastructure upgrades*

Collider Accelerator Department

Brookhaven National Laboratory

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Production Manager

To deliver excellence and innovation in the production of radioisotopes for the benefit of the national interest using high-energy protons at Brookhaven National Laboratory (BNL) for the Department of Energy Isotope Program.

To ensure world class training and development in the application of high energy protons for radioisotopes production for our next generation of radiochemists, nuclear chemists, chemical engineers, physicists.

5 Year Strategic Production Facility Plan

Goals

1. Ensure compliance with cGMP production of Sr-82, and address current and long term productivity and safety challenges.

2. Optimize use of infrastructure to ensure most cost-effective approach to production of current portfolio of radioisotopes for DOE Isotope Program.

3. Enhance precision, efficiency of production processes and analysis of Sr-82 API.

4. Ensure infrastructure is available in a timely manner to accommodate the growing R and D research portfolio.

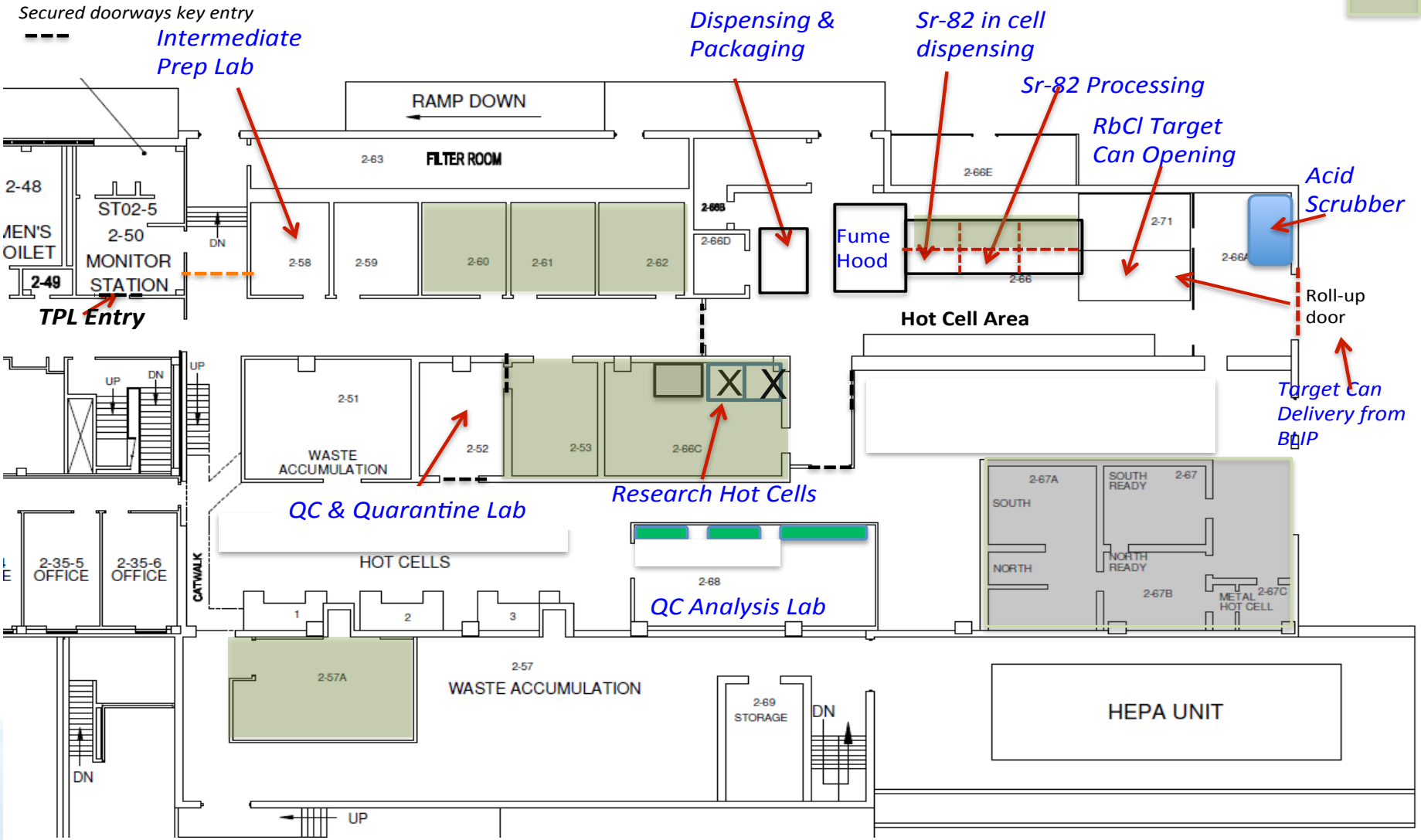
Radioisotope Laboratories, Sr-82 Manufacturing (TPL)

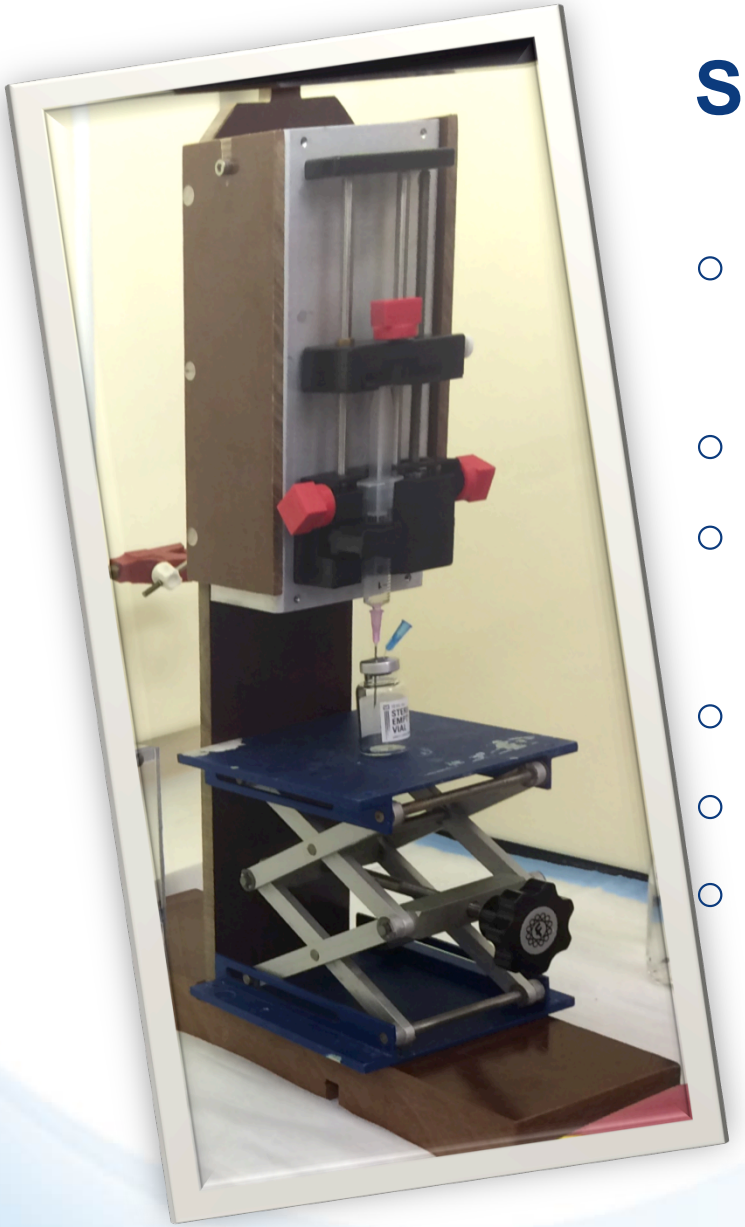
Areas Not in Use

Research Labs

Radiation barrier

Secured doorways key entry





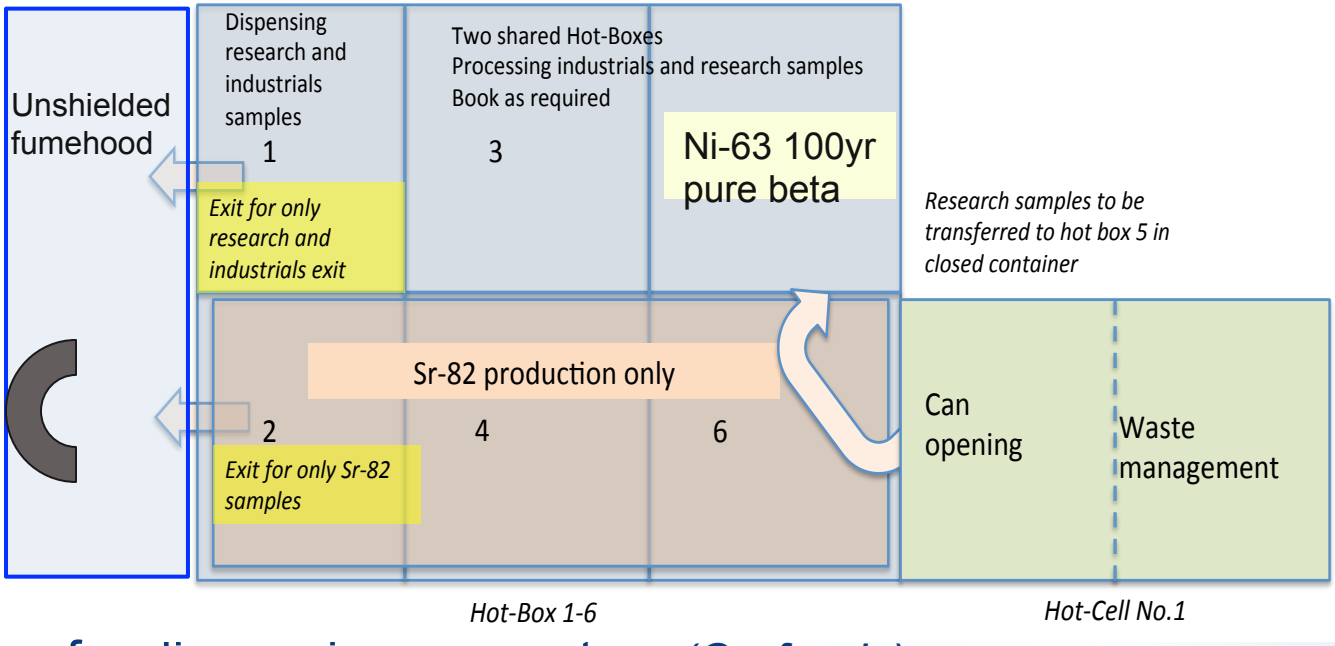
Safety - New approach to dispensing

- Used standard disposal syringes ranging from 1.0 to 100 mL.
- Precision and accuracy excellent.
- Software controlled.

- Reduce dose
- Reduce contamination of API
- Reduce contamination of work areas.

Upgrade TPL Hot-Cell Bank

Goal 1



FY 15

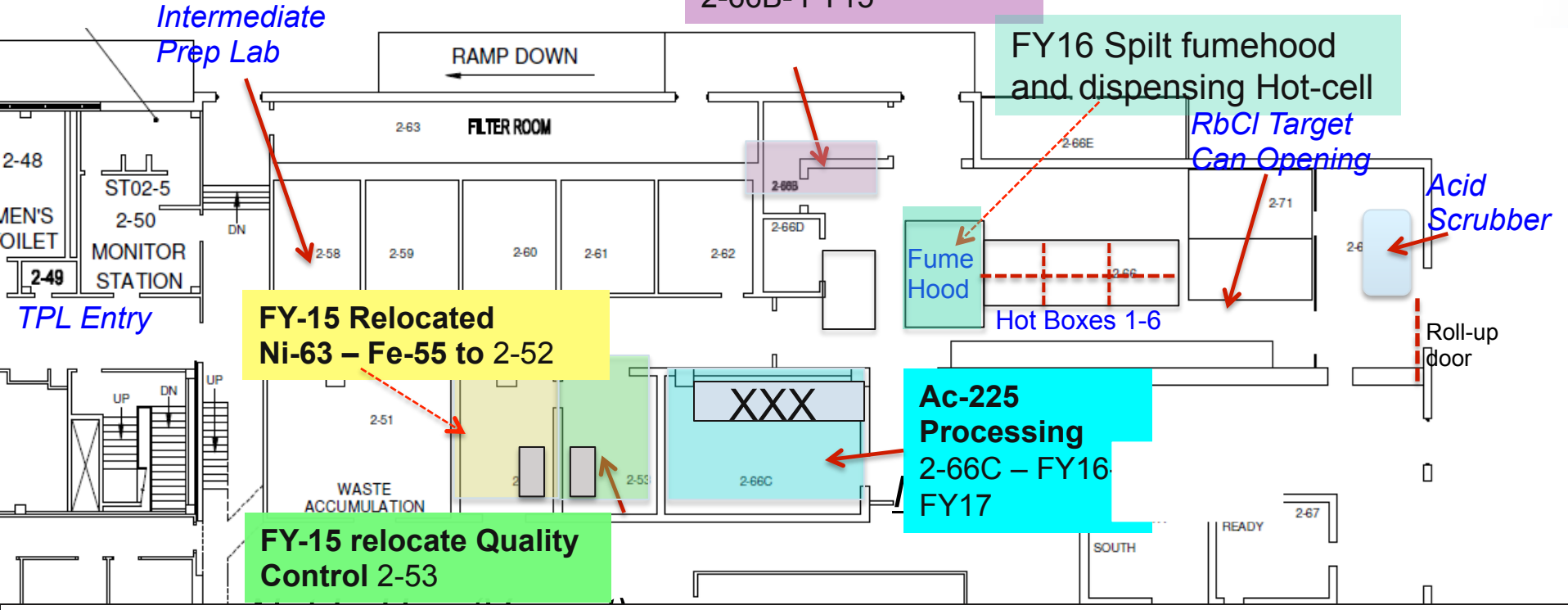
- Introduce shielding for dispensing apparatus. *(Op funds)*
- Pistol grips for Hot-Box 2 and 4. *(Op funds)*
- New can opener for Sr-82 cans. *(Op funds)*
- Implement PLC hot-plate and in cell acid scrubber into Hot-Box (4) *(Op funds)*

FY 16 *(Equipment upgrade funds)*

- New sets of master slave manipulators for Hot-box 2 and 4
- Replace fumehood with smaller fumehood and dispensing hot-cell.

Re-organize production

Goal 2



FY15

- Relocate Ni-63 process to Lab 52 shielding glove box *(Op funds)*
- Out fit Lab 66B with floor and shelving for Biodex container storage. *(Op funds)*
- Relocate QC lab to Lab 53 fit out new fumehood *(Equipment upgrade funds)*

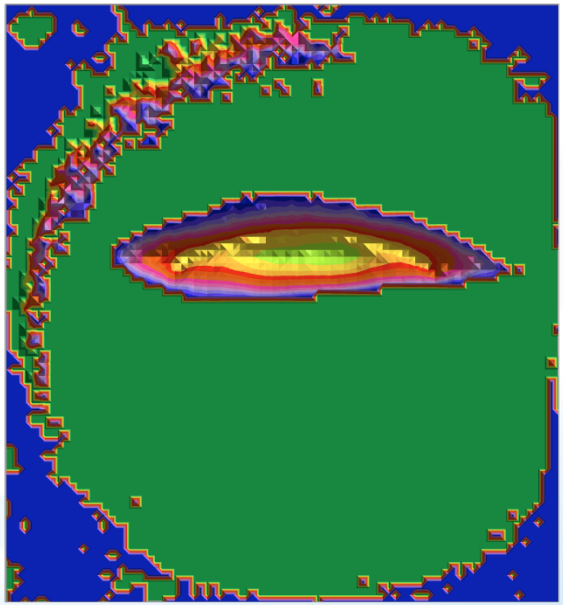
FY16 – FY17

- Outfit Lab 66c for Ac-225 production *(Equipment upgrade funds)*

Upgrade BLIP capabilities

Goal 1 and 3

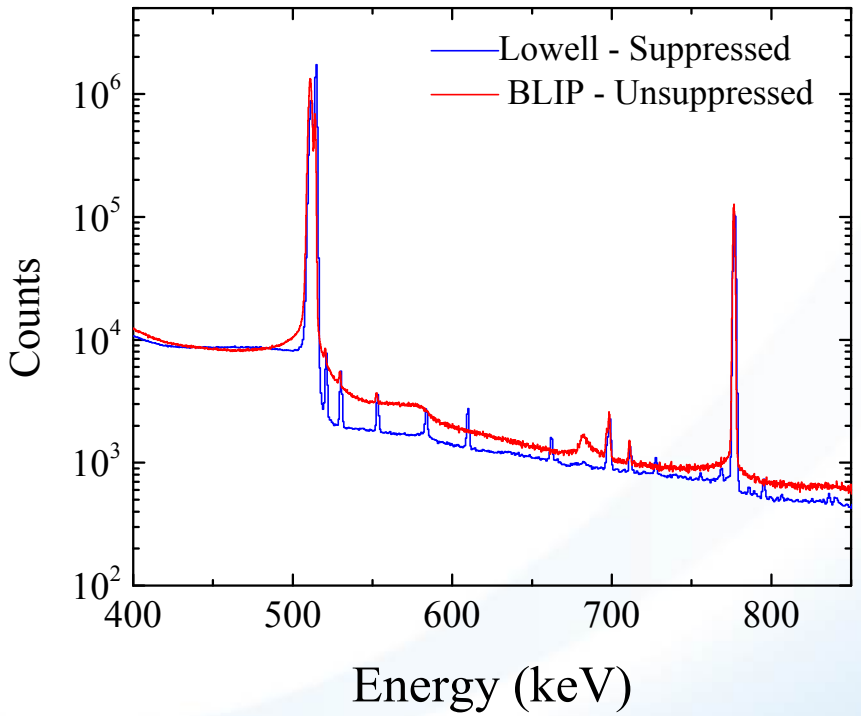
1. In-line water sampling unit. *(Op funds)*
2. QA beam profile *(Op funds)*
    - Bench-top fume hood *(Op funds)*
    - Phosphor imager *(Op funds)*
3. New chain system for target assembly transport. *(Op funds)*



Phase 1- FY15 – FY16

Equipment

- Microplate reader *(Op funds)*
- Fume-hood for transfer of research and industrial products. *(Equipment upgrade funds)*
- New gamma spectrometer *(Equipment upgrade funds)*
- Dispensing Hot-cell for Sr-82 *(Equipment upgrade funds)*



Gamma spectra of Sr-82 with Rb-83 1000:1 ratio

Schedule for TPL and BLIP upgrades for FY15 and FY16

Space		Item	FY2015				FY2016			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
TPL	$50K	Pistol grips for Sr-82 hot boxes	purchase	install						
	$20K	Dedicated Sr-82 can opener	design	implement						
	$30K	PLC hot-plate	validate		implement					
	$5K	In-cell acid scrubber	validate		implement					
	$2K plus shielding $50K	New dispensing unit with shielding	validate/ design shielding		implement					
	$50K	New fumehood				submit for funds				install
	$200K	Dispensing hot-cell for Sr-82				submit for funds				install
	$5K	New solution input lines into hot cells	install							
		Complete processing method validation		gather data		complete report				
	$5K	New plastic curtain barriers	install							
		Air-quality baseline	establish							
BLIP	$50K	Water sampling unit			design	implement				
		Bench-top fumehood for beam QA	install							
	$40K if new	Phosphorimager for beam QA	purchase/move		implement					
	$10K	New chain system for target assembly				design				implement
66C/ BLIP	? To be scoped	Outfit for Ac-225				scope				implement
66B	$10K	New floor and Biodex storage	design		implement					
57A	$40K	Microplate reader (QA/QC)	purchase	implement						
		Optimize Sr-82 process				write report				
68	$60K or up to $120K if compton suppressed	New gamma spectrometer	submit for funds	install						
		Analytical method validation		gather data		complete report				
	$50K purchase and implement	New fumehood/QC relocation		submit for funds	implement					
52		Ni-63 relocation to glove box		commision old glove box		relocate				

op funds

cap funds

Phase Two FY16 - FY17 – FY 18

Evaluate the viability of *(using Op funds)*

- Replacing old hot-boxes for Sr-82 with new hot-cells *(Allows for automation of processes and easier maintenance and servicing)*
- Implementation of transport system – *remove need to transfer through hot-cells.*

Assess and implement

- Modify 66c for processing alpha emitter Ac-225 production. *(Equipment upgrade funds)*
- Commission old ICP OES for analysis of Ac-225 product *(Equipment upgrade funds)*
- Additional Shielding for Ac-225 products (*includes hot-cell at BLIP and transport pig*)

FY-18 to FY-20

Scope out new beamline and radiochemistry facility